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The Mineral Industry of the German Democratic Republic

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The Mineral Industry of the German Democratic Republic

By George A. Rabchevsky[1]

The year 1984 marked 35 years of the establishment of the German Democratic Republic (GDR), and the Government claimed that economically it was also the most successful.

The mineral industry was an important contributor to this growth, as it was in all previous years. The potash, coal, and mining machinery industries were the most active of all, with industrial minerals, steel, and a few nonferrous metals producers also contributing to the economy. Much of the GDR's mineral industry continued to rely on mineral processing, based for the most part on raw materials stocks imported from other Council for Mutual Economic Assistance (CMEA) member countries, especially the U.S.S.R. Nevertheless, the GDR's press ran articles claiming that the GDR could meet 90% by volume of its needs for raw materials from its own production. However, because the country's primary raw material base was by nature rather one sided, the GDR had to meet about 60% by value of its need for primary mineral raw materials and fuels from imports.[2]

The GDR in 1984 reportedly returned to a 5.5% growth rate in the national income; the standard of living, however, apparently stagnated or worsened. Consumption of goods, including industrial products, also slowed down considerably.

Despite the official claims that 1984 was the most successful year in the history of the GDR, the mineral industry apparently did not fare well. By some estimates, metal production, mostly steel, increased by 9.5%.[3] Industry, including the minerals processing, claimed to have contributed 70% of the increase in the national income, thus the largest such contributor of all other industries. The pressure on GDR's industry to perform was intensified; for instance, about 30% of all industrial combines (enterprises) were reportedly working on three shifts, but productivity continued to remain low.[4]

About $20 billion[5] was invested in the national economy according to official statements. The mineral industry's share of investments in rationalization increased to 57%. Expenditures by the Government in the exploration for new indigenous resources, especially energy, was also being increased. At least 250,000 meters are drilled annually, for example, for the exploration of lignite deposits alone. As a result, even the areas of Potsdam, Neubrandenburg, and Schwerin, which lie outside the traditional mining regions, have been investigated. Natural gas production, which began to expand in the GDR in the mid-1970's, was also investigated in 1984, with the assistance of Soviet geologists.

PRODUCTION

Despite the official claims of industrial production increases of 4.3% to 5.3% and of labor productivity increases of 5% to 7.6%, at least in the mineral industry, the output was erratic. Approximately 90% of the increase in national income resulted reportedly from increased industrial productivity. The overall labor productivity increased 7.7%, in part owing to the claimed introduction of modern technology and new products. The extractive raw materials sector either stagnated at the 1980 levels or declined. This pertained even to potash and coal output, traditionally the stalwarts of the

GDR's mining industry.

Increases in the national economy and on production lines were claimed to have been achieved despite a reduction of approximately 5% in the consumption of energy and raw materials. The 1984 national economic plan fulfillment report also stated that the utilization of production equipment improved and that equipment was modernized on a large scale. More than one-third of industrial equipment was less than 5 years old. In the mineral industries, this seemed unlikely, however, even though some steel plants were upgraded. According to the same report, 3,270 new products were introduced by the metals industry. A total of 43,000 robots were in use in the GDR's mining and metals manufacturing industry in 1984, which seems to be in-line with the 1981-85 plan period.

Lacking significant indigenous raw materials, the utilization of secondary raw or scrap materials expanded. Almost 12% of the required industrial raw materials was provided by secondary materials. In the metals production sector, that rate may have been twice as high.

The extraction of raw materials was carried out by surface mining and underground mining, including block caving. In the GDR, about 90% of all mineral raw materials was extracted by surface mining. Using high-output, heavy equipment, and highly mechanized conveyors in coal mining, production capacities of up to 100,000 tons of coal per day were at times achieved. Well over 1,000 deposits were claimed to exist in the GDR; primarily, these were of industrial minerals such as gravel, sand, and clays. More than 13% of the total demand for sand and gravel was reclaimed from the overburden stripped off workable coal deposits. Secondary metals were obtained also from copper-bearing schists and tin ores, and bromine was extracted during the processing of potash salts.[6]

Table 1.—German Democratic Republic: Production of mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity[2]	1980	1981	1982	1983[p]	1984[e]
METALS					
Aluminum:					
Alumina:					
For metallurgical use	43,025	45,164	46,085	42,156	43,000
For other use[e]	20,000	20,000	20,000	20,000	20,000
Metal:[e]					
Primary	60,000	60,000	[3]58,000	[r]57,000	58,000
Secondary	52,500	52,000	50,000	52,000	52,000
Total	112,500	112,000	108,000	[r]109,000	110,000
Cadmium metal, primary[e]	16	16	16	16	16
Copper:					
Mine output, metal content	11,800	12,000	[e]13,000	[e]12,000	12,000
Metal:					
Smelter, primary	16,000	16,000	17,000	17,000	17,000
Refined:[e]					
Primary	32,000	34,000	32,000	[r]31,000	31,000
Secondary	19,000	20,000	19,000	19,000	19,000
Total	51,000	54,000	51,000	[r]50,000	50,000
Iron and steel:					
Iron ore and concentrate thousand tons	40	40	40	40	40
Metal content do	20	20	20	20	20
Metal:					
Pig iron do	2,458	2,441	2,149	2,207	2,250
Ferroalloys, electric furnace do	[r]137	[r]135	125	128	130
Steel, crude do	7,308	7,467	7,169	7,219	7,250
Semimanufactures (hot-rolled only) do	5,128	5,061	4,959	5,084	5,285
Lead:[e]					
Smelter, primary	22,000	22,000	20,000	20,000	22,000
Refined, all sources	42,000	48,000	50,000	[r]40,000	45,000
Nickel:					
Mine output, metal content, recoverable	2,700	2,700	2,500	[e]2,200	2,000
Metal, refined[e]	3,000	2,800	3,000	[r]3,000	3,000
Silver, mine output, metal content, recoverable thousand troy ounces	1,510	1,450	1,450	1,380	1,360
Tin:[e]					
Mine output, metal content, recoverable	1,800	1,600	1,700	[r]1,800	1,800
Metal, smelter output including secondary	1,800	1,500	2,000	2,000	2,000
Zinc metal including secondary	16,000	16,000	17,000	16,500	17,000

See footnotes at end of table.

Table 1.—German Democratic Republic: Production of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity[2]		1980	1981	1982	1983[p]	1984[e]
NONMETALS						
Barite[e]		35,000	35,000	35,000	35,000	35,000
Boron materials: Processed borax, $Na_2B_4O_7$• $10H_2O$ content		3,400	4,300	[e]4,200	[e]4,000	4,000
Cement, hydraulic	thousand tons	12,440	12,204	11,721	11,782	11,800
Chalk[e]	do.	50	50	50	40	40
Clays, kaolin:[e]						
Crude	do.	400	400	420	400	350
Marketable	do.	200	200	210	200	175
Fluorspar[e]	do.	100	100	100	100	100
Gypsum and anhydrite:						
Crude[e]	do.	360	360	360	360	360
Calcined	do.	313	303	310	297	300
Lime and dead-burned dolomite	do.	3,401	3,441	3,510	3,458	3,500
Nitrogen: N content of ammonia	do.	1,182	1,205	1,170	1,211	1,200
Potash, marketable, K_2O equivalent	do.	3,422	3,460	3,434	3,431	3,465
Pyrite, gross weight[e]	do.	25	25	20	20	19
Salt:						
Marine	do.	52	56	55	56	55
Rock	do.	3,076	3,056	3,060	3,070	3,075
Total	do.	3,128	3,112	3,115	3,126	3,130
Sodium compounds, n.e.s.:						
Caustic soda	do.	626	631	695	687	690
Sodium carbonate	do.	866	878	882	887	890
Sodium sulfate	do.	124	128	142	152	155
Stone, sand and gravel:						
Crushed stone[e]	do.	15,000	15,500	15,000	16,000	14,500
Sand and gravel	do.	10,353	9,803	8,566	[e]9,000	8,500
Sulfur:						
Byproduct:[e]						
Elemental	do.	80	80	90	90	80
Other forms	do.	270	270	270	[r]270	270
From pyrite[e]	do.	10	10	—	—	—
Sulfuric acid	do.	958	948	920	926	920
MINERAL FUELS AND RELATED MATERIALS						
Coal, brown coal (lignite)	do.	258,097	266,734	276,038	277,968	296,000
Coke:						
From anthracite and bituminous coal[e]	do.	1,500	1,391	1,226	1,200	1,150
From brown coal:						
High-temperature	do.	2,608	2,612	2,592	2,510	2,500
Low-temperature	do.	2,727	2,747	2,919	3,210	3,300
Total	do.	6,835	6,750	6,737	6,920	6,950
Fuel briquets (from lignite)	do.	49,693	49,803	50,005	50,047	52,850
Gas:						
Manufactured	million cubic feet	219,057	209,483	224,173	255,320	255,500
Natural, marketed production[e]	do.	302,450	301,000	286,000	353,000	424,000
Petroleum:						
Crude	thousand 42-gallon barrels	400	400	422	383	380
Refinery products:						
Gasoline	do.	28,333	29,257	33,071	33,618	33,700
Kerosine, jet fuel, distillate fuel oil	do.	46,503	42,665	46,679	46,915	47,000
Residual fuel oil	do.	59,300	56,610	56,610	56,610	57,000
Lubricants	do.	2,894	3,012	3,058	3,238	3,300
Total[4]	do.	137,030	131,544	139,418	140,381	141,000

[e]Estimated. [p]Preliminary. [r]Revised.

[1]Table includes data available through Sept. 30, 1985.

[2]In addition to the commodities listed, magnesium, peat, and a variety of construction materials are produced, but output was not reported, and available information is inadequate to make estimates of output levels.

[3]Reported figure.

[4]Total of listed products only; no estimates have been made for unreported products or refinery fuels and losses.

TRADE

The GDR's foreign trade position continued to improve with a yearend increase of total foreign trade turnover of 8%, compared with that of 1983.

Trade within the CMEA block accounted for about two-thirds of the GDR's total trade turnover. In 1984, the GDR's trade with CMEA countries rose 9% compared with that of 1983. The U.S.S.R. remained the GDR's single largest trading partner

both within and outside the CMEA organization, accounting for 40% of the country's imports and exports. Over 50% of Soviet exports to the GDR consisted of raw materials and energy.

In 1984, Soviet deliveries of petroleum and natural gas to the GDR showed increases compared with those for 1983. Pig iron, ferroalloys, iron and steel scrap, and rolled steel deliveries to the GDR also showed modest increases during the year. However, deliveries of manganese, chromium ores, and iron declined by 25%, 24%, and 12%, respectively.[7]

Trade with market economy countries rose 6% compared with that of 1983. The Federal Republic of Germany (FRG) was the GDR's largest trading partner, accounting for 8.5% of total trade. Other important trading partners of the GDR were Austria, Finland, France, and Italy. The main exports to these countries were petroleum refinery products, iron and steel products, and chemicals. The GDR's imports consisted largely of producer durables, which were generally not available on the CMEA market as well as some chemical products and textiles.

The GDR's commercial relations with the United States were marked by a sharp export increase to the U.S. market. The GDR's exports to the United States reached $167.4 million in 1984 from $62.6 million in 1983. This increase was largely due to large U.S. purchases of steel.

Table 2.—German Democratic Republic: Apparent exports of selected mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity	1982	1983[p]	Destinations, 1983	
			United States	Other (principal)
METALS				
Aluminum:				
Oxides and hydroxides	44	479	--	All to Madagascar.
Ash and residue containing aluminum	279	501	--	All to Netherlands.
Metal including alloys:				
Scrap	11,545	9,780	--	Netherlands 2,974; United Kingdom 2,859; France 2,127.
Unwrought	26,180	25,704	--	West Germany 21,231; Poland 2,093.
Semimanufactures	16,724	21,621	3	West Germany 14,364; Hungary 3,259.
Columbium and tantalum: Metal including alloys, all forms, tantalum, kilograms	--	100	--	All to Austria.
Copper: Metal including alloys:				
Scrap	560	355	--	Austria 270; United Kingdom 85.
Unwrought	5,003	12,261	--	West Germany 6,269; Netherlands 4,670.
Semimanufactures	29,360	35,616	28	West Germany 34,543.
Iron and steel:				
Iron ore and concentrate excluding roasted pyrite	141,609	NA		
Metal:				
Scrap	20,050	20,654	--	West Germany 17,674; Thailand 1,052.
Pig iron, cast iron, related materials	17,319	8,841	--	Sweden 4,200; West Germany 1,957.
Ferroalloys:				
Ferrochromium	2,114	1,575	--	All to West Germany.
Ferromanganese	9,000	450	--	Belgium-Luxembourg 300.
Ferromolybdenum	151	9	--	All to Sweden.
Ferrosilicon	7,281	9,207	--	West Germany 7,111; Netherlands 1,394.
Unspecified	1,689	654	--	Belgium-Luxembourg 517; Switzerland 126.
Steel, primary forms thousand tons	324	402	--	West Germany 183; Italy 140; Turkey 30.
Semimanufactures:				
Bars, rods, angles, shapes, sections do	1,105	220	1	West Germany 86; France 25; Jordan 17.
Universals, plates, sheets do	434	429	10	West Germany 102; Denmark 49; Portugal 38.
Hoop and strip do	392	75	--	West Germany 71; France 2.
Rails and accessories do	14	3	--	Mainly to West Germany.

See footnotes at end of table.

Table 2.—German Democratic Republic: Apparent exports of selected mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1982	1983[p]	Destinations, 1983	
			United States	Other (principal)
METALS —Continued				
Iron and steel —Continued				
Metal —Continued				
Semimanufactures —Continued				
Wire thousand tons	47	10	--	West Germany 7; Netherlands 1.
Tubes, pipes, fittings do.	172	[2]168	--	West Germany 28; Poland 22; Hungary 21.
Castings and forgings, rough do.	73	46	--	West Germany 44; France 1.
Lead:				
Oxides	1,524	1,493	--	West Germany 832; Sweden 637.
Metal including alloys:				
Scrap	--	523	--	All to Austria.
Unwrought	1,950	500	--	All to West Germany.
Semimanufactures	75	38	--	Do.
Nickel: Metal including alloys:				
Unwrought	66	536	--	Sweden 415; Italy 72.
Semimanufactures	3	5	--	Yugoslavia 4.
Platinum-group metals: Metals including alloys, unwrought and partly wrought value, thousands	$109	$53	--	Japan $52.
Silver:				
Waste and sweepings do.	$305	$225	--	All to West Germany.
Metal including alloys, unwrought and partly wrought do.	$83,664	$75,805	--	United Kingdom $75,601.
Zinc:				
Oxides	1	785	--	West Germany 450; Norway 335.
Metal including alloys:				
Scrap	--	202	--	All to France.
Unwrought	1,885	309	--	West Germany 200; Sweden 109.
Other:				
Oxides and hydroxides	2,032	81	--	All to Belgium-Luxembourg.
Ashes and residues	34,520	27,963	--	Austria 20,454; West Germany 7,509.
Base metals including alloys, all forms	6,201	5,013	3	West Germany 5,010.
NONMETALS				
Abrasives, n.e.s.: Grinding and polishing wheels and stones	307	283	NA	Yugoslavia 162; Pakistan 48; Italy 28.
Barite and witherite	40	8,551	--	Poland 7,990; West Germany 537.
Bromine	430	587	--	France 330; West Germany 156.
Cement[3] thousand tons	1,291	1,222	--	West Germany 492; Sweden 142; Hungary 126.
Chalk[3]	45,571	21,856	--	West Germany 8,293.
Clays, crude:				
Kaolin[3]	146,062	111,417	--	West Germany 92,509; Poland 7,463.
Unspecified	45,684	16,921	--	Yugoslavia 10,941; Hungary 4,170.
Diamond:				
Gem, not set or strung value, thousands	$2	$2,850	--	All to Portugal.
Industrial stones do.	$185	$21	--	All to Belgium-Luxembourg.
Feldspar, fluorspar, related materials	43,748	39,100	--	West Germany 15,501; Norway 8,071; Austria 7,786.
Fertilizer materials: Manufactured:				
Ammonia	8,329	85,119	--	West Germany 58,280; Norway 10,000; Sweden 6,663.
Nitrogenous	974,226	1,308,669	--	West Germany 1,260,220; United Kingdom 34,917.
Phosphatic	33,149	4,052	--	Netherlands 2,702; Austria 1,132.
Potassic, K_2O content[3] thousand tons	2,834	2,905	49	Czechoslovakia 455; Brazil 443; Romania 189.
Graphite, natural	103	1,382	--	West Germany 1,282.
Gypsum and plaster[3]	101,758	84,863	--	Mainly to Sweden.
Magnesium compounds	76	28,180	--	France 28,128.
Phosphates, crude	22,000	22,635	--	Bulgaria 22,000; Ireland 593.
Pigments, mineral: Iron oxides and hydroxides, processed	399	432	--	Yugoslavia 424.
Potassium salts, crude	97,203	18,849	--	West Germany 12,370; Austria 3,634.
Pyrite, unroasted	--	2,999	--	All to Italy.
Salt and brine[3] thousand tons	1,387	1,390	--	West Germany 127; Sweden 97; undetermined 1,037.
Sodium compounds, n.e.s.:				
Carbonate, manufactured[3]	394,300	365,900	--	Czechoslovakia 65,000; West Germany 43,480; Finland 16,049.
Sulfate, manufactured	2,406	19,606	--	West Germany 11,725; Sweden 5,350.

See footnotes at end of table.

Table 2.—German Democratic Republic: Apparent exports of selected mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1982	1983[p]	Destinations, 1983	
			United States	Other (principal)
NONMETALS —Continued				
Stone, sand and gravel:				
Dimension stone, crude and partly worked thousand tons	439	364	--	West Germany 362.
Dolomite, chiefly refractory-grade do	--	(4)	--	All to Denmark.
Sand and gravel[3] do	2,114	2,550	--	All to West Germany.
Sulfur:				
Elemental:				
Crude including native and by-product	748	2,103	--	All to Yugoslavia.
Colloidal, precipitated, sublimed	45	118	--	West Germany 108.
Sulfuric acid[3]	30,345	37,300	--	Yugoslavia 21,604; West Germany 11,939.
Talc, steatite, soapstone, pyrophyllite	--	32	--	All to Jordan.
Vermiculite, perlite, chlorite	--	170	--	All to Austria.
Other:				
Crude	86,491	81,136	--	Denmark 57,024; Netherlands 11,798.
Slag and dross, not metal-bearing	35,652	30,748	--	Finland 29,086; West Germany 1,009.
MINERAL FUELS AND RELATED MATERIALS				
Carbon: Carbon black	4,823	3,961	11	Czechoslovakia 1,000; Poland 591; United Kingdom 547.
Coal:				
Anthracite and bituminous thousand tons	305	325	--	Poland 283; United Kingdom 41.
Briquets of anthracite and bituminous coal do	490	515	--	All to Hungary.
Lignite including briquets[3] do	3,947	3,285	--	West Germany 1,418; Czechoslovakia 676; Austria 300.
Coke and semicoke do	215	32	--	Austria 20; Belgium-Luxembourg 5.
Gas, manufactured[3] million cubic feet	653	399	--	NA.
Peat including briquets and litter	1,467	1,189	--	West Germany 1,142.
Petroleum:				
Crude thousand 42-gallon barrels	--	1,132	--	All to United Kingdom.
Refinery products:				
Liquefied petroleum gas do	997	1,557	--	West Germany 1,239; Netherlands 158.
Gasoline[3] do	6,243	10,893	--	West Germany 2,776; undetermined 7,269.
Mineral jelly and wax do	105	63	13	Netherlands 17; Austria 7; Yugoslavia 5.
Kerosine and jet fuel do	84	94	--	Hungary 83; Sweden 11.
Distillate fuel oil[3] do	6,088	18,038	--	West Germany 9,587; Sweden 5,780; Norway 2,221.
Lubricants[2] do	69	170	--	Mainly to Austria.
Residual fuel oil[3] do	14,399	13,686	--	Norway 4,151; Denmark 3,420; West Germany 3,166.
Bitumen and other residues do	564	583	--	West Germany 582.

[p]Preliminary. NA Not available.

[1]Table prepared by Jozef Plachy. Owing to a lack of official trade data published by the German Democratic Republic, this table should not be taken as a complete presentation of this country's mineral trade. Unless otherwise specified, these data have been compiled from United Nations information and data published by the partner trade countries.

[2]Statistical Yearbook of Members of the Council for Mutual Economic Assistance, Moscow, U.S.S.R.

[3]Official Trade Statistics of the German Democratic Republic.

[4]Less than 1/2 unit.

Table 3.—German Democratic Republic: Apparent imports of selected mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity	1982	1983[p]	Sources, 1983	
			United States	Other (principal)
METALS				
Aluminum:				
Ore and concentrate[2]	109,900	103,700	--	Mainly from Hungary.
Oxides and hydroxides	100,171	89,178	--	West Germany 61,857; Hungary 27,259.
Metal including alloys:				
Unwrought	44,426	51,105	--	Yugoslavia 35,094; Hungary 9,891.
Semimanufactures	25,112	26,384	1	West Germany 12,540; Hungary 8,612; Yugoslavia 4,983.
Antimony: Oxides	253	220	--	All from France.
Cadmium: Metal including alloys, all forms	252	220	--	Japan 205.
Chromium: Ore and concentrate, Cr_2O_3 content[2]	46,800	51,900	--	NA.
Cobalt: Metal including alloys, all forms	181	132	--	Finland 107; Netherlands 25.
Copper:				
Matte and speiss including cement copper	--	360	--	All from Ireland.
Metal including alloys:				
Scrap	1,626	2,337	--	Netherlands 691; Belgium-Luxembourg 658; Switzerland 473.
Unwrought	36,649	42,635	--	West Germany 23,169; Chile 7,200; Finland 4,923.
Semimanufactures	5,220	8,704	--	France 3,561; West Germany 3,479.
Gold: Metal including alloys, unwrought and partly wrought, troy ounces	579	207	--	All from West Germany.
Iron and steel:				
Iron ore and concentrate excluding roasted pyrite, Fe content[2], thousand tons	1,932	1,842	--	U.S.S.R. 1,369; India 449.
Metal:				
Scrap, do.	455	595	--	U.S.S.R. 224; West Germany 195; Belgium-Luxembourg 93.
Pig iron, cast iron, related materials[3], do.	871	855	--	West Germany 31; undetermined 824.
Ferroalloys:				
Ferrochromium	--	1,990	--	All from West Germany.
Ferromanganese	--	935	--	Do.
Ferromolybdenum	--	2	--	Do.
Silicon metal	102	221	--	Do.
Unspecified	78,000	NA	--	
Steel, primary forms, thousand tons	2,320	[3]729	--	U.S.S.R. 249; West Germany 196; Czechoslovakia 86.
Semimanufactures:				
Bars, rods, angles, shapes, sections, do.	771	738	--	West Germany 402; U.S.S.R. 227; Austria 76.
Universals, plates, sheets, do.	816	1,063	--	U.S.S.R. 479; West Germany 350; Austria 126.
Hoop and strip, do.	129	95	--	West Germany 77; Austria 17.
Rails and accessories, do.	189	4	--	All from West Germany.
Wire, do.	26	9	--	West Germany 6; Belgium-Luxembourg 2.
Tubes, pipes, fittings[3], do.	298	295	--	Czechoslovakia 127; West Germany 46; Poland 20.
Castings and forgings, rough, do.	37	3	--	West Germany 2.
Lead:				
Oxides	8	691	--	West Germany 660.
Metal including alloys:				
Scrap	1,702	3,764	--	United Kingdom 1,822; Denmark 1,382.
Unwrought	3,929	3,047	--	Sweden 1,997; France 703.
Manganese: Ore and concentrate, metallurgical-grade, Mn content[2]	39,800	27,400	--	Mainly from U.S.S.R.
Mercury, 76-pound flasks	1,363	6,380	--	West Germany 5,597.
Molybdenum: Ore and concentrate	425	310	--	All from Finland.
Nickel:				
Matte and speiss	821	781	--	All from Cuba.
Oxides and hydroxides	615	589	--	Do.
Metal including alloys:				
Unwrought	198	536	--	France 310; Finland 216.
Semimanufactures	134	90	9	West Germany 80.
Platinum-group metals: Metals including alloys, unwrought and partly wrought, value, thousands	$905	$5,163	--	West Germany $5,049.
Silver:				
Waste and sweepings, do.	--	$46	--	All from West Germany.
Metal including alloys, unwrought and partly wrought, do.	$111,905	$120,241	--	West Germany $113,329; United Kingdom $5,132.

See footnotes at end of table.

Table 3.—German Democratic Republic: Apparent imports of selected mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1982	1983[p]	Sources, 1983	
			United States	Other (principal)
METALS —Continued				
Tin:				
Oxides	72	61	--	All from West Germany.
Metal including alloys:				
Scrap	27	NA		
Unwrought	312	30	--	Do.
Titanium:				
Ore and concentrate	1,297	1,752	--	All from Netherlands.
Oxides	18,856	17,002	--	Yugoslavia 11,173; Finland 3,602.
Tungsten: Ore and concentrate	130	45	--	All from Netherlands.
Zinc:				
Ore and concentrate	63,648	65,338	--	West Germany 61,492.
Oxides	109	160	--	West Germany 117; France 43.
Metal including alloys:				
Scrap	504	41	--	Denmark 21; Sweden 20.
Unwrought	28,011	16,545	--	Yugoslavia 10,487; West Germany 2,833; Finland 2,825.
Semimanufactures	1,559	2,145	--	West Germany 1,945; Norway 190.
Other:				
Ores and concentrates	5,144	5,060	--	Norway 5,028.
Oxides and hydroxides	6,983	NA		
Ashes and residues	6,470	11,200	--	West Germany 9,195; Belgium-Luxembourg 974; Italy 941.
Base metals including alloys, all forms	25,090	49,176	--	West Germany 25,877; Singapore 23,000.
NONMETALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc	140	24	--	All from Italy.
Artificial: Corundum	3,934	3,754	--	All from West Germany.
Dust and powder of precious and semiprecious stones including diamond value, thousands	$69	NA		
Grinding and polishing wheels and stones	113	127	--	Austria 113.
Asbestos, crude[3]	61,200	47,000	--	NA.
Barite and witherite	667	1,472	--	All from West Germany.
Boron materials:				
Crude natural borates	15,408	9,472	--	Do.
Oxides and acids	4,965	4,431	--	All from France.
Cement[3]	7,300	6,200	--	West Germany 1,778; Belgium-Luxembourg 543.
Clays, crude:				
Bentonite	10,539	10,499	--	All from Hungary.
Unspecified	7,066	2,484	88	West Germany 2,304.
Diamond:				
Gem, not set or strung value, thousands	$200	$29	--	West Germany $20.
Industrial stones do.	$709	$447	--	Belgium-Luxembourg $437.
Diatomite and other infusorial earth	857	1,633	--	France 864; West Germany 559.
Feldspar, fluorspar, related materials	14,748	16,815	--	Norway 7,308; Sweden 6,953.
Fertilizer materials: Manufactured:				
Ammonia	1	2,403	--	All from West Germany.
Nitrogenous, N_2 content[3]	69,400	110,000	--	West Germany 71,081.
Phosphatic, P_2O_5 content[3]	21,200	15,129	--	All from West Germany.
Potassic	--	19,023	--	All from Finland.
Unspecified and mixed	105,500	203,340	--	Austria 203,338.
Graphite, natural[3]	7,945	6,359	--	West Germany 1,544; undetermined 4,596.
Gypsum and plaster	174	170	--	Belgium-Luxembourg 124.
Magnesium compounds:				
Magnesite	48,884	[3]10,972	--	All from Czechoslovakia.
Other	1,271	NA		
Phosphates, crude, P_2O_5 content[3] thousand tons	420	419	--	All from U.S.S.R.
Pigments, mineral: Natural, crude	46	47	--	All from Austria.
Precious and semiprecious stones other than diamond: Natural value, thousands	$148	$43	--	All from West Germany.
Salt and brine	29	16	--	All from Sweden.
Sodium compounds, n.e.s.: Carbonate, manufactured	5	4,999	--	All from France.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	5,188	5,605	--	Hungary 1,788; Norway 1,761; West Germany 1,227.
Worked	1,208	15,120	--	West Germany 14,388.
Gravel and crushed rock	326	263	--	Yugoslavia 195.
Quartz and quartzite	11,952	153	--	Brazil 150.
Sand other than metal-bearing	499	10,058	--	West Germany 10,007.
Sand and gravel	--	5,051	--	All from West Germany.

See footnotes at end of table.

Table 3.—German Democratic Republic: Apparent imports of selected mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1982	1983[p]	Sources, 1983	
			United States	Other (principal)
NONMETALS —Continued				
Sulfur:				
Elemental, crude including native and by-product	337,900	157,000	--	All from Poland.
Dioxide	9,412	1,373	--	All from West Germany.
Sulfuric acid	808	[3]1,800	--	NA.
Talc, steatite, soapstone, pyrophyllite	5,222	1,546	--	Austria 617; West Germany 580; Finland 326.
Other:				
Crude	27,206	21,494	--	Hungary 21,492.
Slag and dross, not metal-bearing	1,632	700	--	All from Denmark.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural	39	4,162	--	West Germany 4,158.
Carbon: Carbon black	37,738	41,926	--	U.S.S.R. 22,628; West Germany 18,918.
Coal:				
Anthracite and bituminous[2] thousand tons	4,739	4,198	--	U.S.S.R. 2,958; Poland 622; Czechoslovakia 596.
Lignite including briquets do.	3,600	200	--	All from Poland.
Coke and semicoke[2] do.	2,022	1,820	--	U.S.S.R. 1,025; Czechoslovakia 533; Poland 142.
Gas, natural: Gaseous[2] million cubic feet	225,731	226,543	--	U.S.S.R. 226,437.
Petroleum:				
Crude[2] thousand 42-gallon barrels	158,739	166,183	--	U.S.S.R. 125,325.
Refinery products:				
Liquefied petroleum gas do.	1	433	--	All from West Germany.
Gasoline do.	6	5	--	West Germany 4.
Mineral jelly and wax do.	[4]	[4]	--	All from France.
Kerosine and jet fuel do.	58	8	--	All from Yugoslavia.
Distillate fuel oil do.	2	32	--	Sweden 30.
Lubricants[3] do.	117	159	[4]	NA.
Residual fuel oil[3] do.	141	679	--	NA.
Bitumen and other residues do.	1	2	--	West Germany 1.
Bituminous mixtures do.	2	[4]	--	Mainly from France.
Petroleum coke do.	'16	120	--	All from West Germany.
Unspecified[3] do.	582	8	--	NA.

[p]Preliminary. NA Not available.

[1]Table prepared by Jozef Plachy. Owing to a lack of official trade data published by the German Democratic Republic, this table should not be taken as a complete presentation of this country's mineral trade. Unless otherwise specified, these data have been compiled from United Nations information and data published by the partner trade countries.

[2]Official Trade Statistics of the German Democratic Republic.

[3]Statistical Yearbook of Members of the Council for Mutual Economic Assistance, Moscow, U.S.S.R.

[4]Less than 1/2 unit.

COMMODITY REVIEW

METALS

Iron and Steel.—The GDR's iron and steel industry continued its second year of growth, after a drop in production in 1982. By some estimates, the GDR in 1984 was in 19th place in world output of raw steel, just slightly overtaking Mexico and slightly below the Republic of South Africa. The chief aim of the GDR's iron and steel industry has been to improve production efficiency and to expand the range of marketable goods, rather than to increase raw steel output. The use of oxygen converter technology late in 1984 showed a potential for significant energy savings as well as for a reduction of losses.[a] At enterprises such as the VEB Qualität und Edelstahl, production was enhanced by a direct billet feed system from large-scale electric furnaces to continuous rolling mills. To expand product range, another enterprise, the VEB Bandstahl-

kombinat "Hermann Matern" of Eisenhüttenkombinat Ost (EKO), at Eisenhüttenstadt planned to replace its conventional cold-rolled sheet and strip product line with a wide-range, thin cold-rolled strip (minimum thickness 0.3 millimeter) produced by a high-output roll stand.[9] EKO put on-stream the GDR's first oxygen converter shop, consisting of two 210- to 235-ton oxygen converters with a 2.1-million-ton-per-year raw steel capacity, as well as an argon stirring station with a steel desulfurization and a degassing unit, and two-strand continuous slab and six-strand continuous bloom casters. The project cost was about $597 million, with technology provided by Voest-Alpine AG (VA) of Austria. During the year, EKO also began the reconstruction and expansion of its sixth blast furnace to 1,100 cubic meters for pig iron production; completion was scheduled for mid-1985.

Other developments in 1984 included the startup of a new 770,000-ton-per-year continuous wire rod mill at the Brandenburg steel works near Potsdam, and a new 12,600-ton-per-year steel foundry at Boesdorf near Leipzig. The Boesdorf foundry was built by a Japanese, Hungarian, Polish, and GDR consortium of companies.

At yearend, the U. S. International Trade Commission issued a determination that the GDR's exports of carbon steel wire rod to the United States had materially injured U.S. domestic producers owing to allegedly unfair low prices of the GDR products.[10]

Precious Metals.—Except for a small production of mined silver, the GDR recovered its precious metals from scrap. In September, a plant for the recovery of precious metals from electronic scrap reportedly began operation at Dahlwitz-Hoppegarten near Berlin. Previously, this was done by students of the Technological University Merseburg, mostly during their summer vacation. Twenty workers formerly processed 5 tons in an entire shift, while the new automatic facility reportedly accomplished this in 1 hour.

The scrap, consisting of electronic switches, relays, and scientific apparatus and household articles, was transported on a conveyor belt to a hammer mill and a rotor, shredding the material to 10-centimeter size fraction. It then was sorted in a magnetic separator, a drum, an air separator, and a flotation tank, yielding 50% to 60% steel scrap, 10% copper, and 15% aluminum. It was estimated that 1 ton of processed scrap contained 450 grams of silver and 14 grams of gold.[11]

NONMETALS

Graphite.—The GDR imported virtually all its requirements of natural graphite. Except for a slight drop in 1980, imports had continued to grow in the last decade, being on the average 8,000 to 9,000 tons per year. In 1984, VEB Elektrokohle, the sole GDR graphite electrode producer, at Lichtenberg near Berlin, modernized its works and reportedly ordered a new plant from Austria's VA. The order covered mixers and kneaders for petroleum coke and hard pitch, and a hydraulic extrusion press for producing green electrodes. The new equipment was to be fitted with measuring and control facilities aimed at making the operation virtually automatic and continuous. VA was to begin deliveries in 1987, and the plant was expected on-stream in mid-1988.

The Lichtenberg electrode plant, which after modernization was to produce some 20,000 tons per year of graphite electrodes, dates from the beginning of the century. It was built originally for arc lamp production, and graphite electrodes were made after 1916. In the late 1970's, VA also supplied an electrode press to the Novy Sacz electrode plant at Ratibor in Poland, the largest such press in the world.[12]

Potash.—Mining and production of potash in the GDR contributed significantly to the economy of the country, and, after coal, was the only mineral mined on a large scale. The GDR was the third largest producer in the world, after the U.S.S.R. and Canada. Production has hovered just over 3.40 million tons for several years. Exports and domestic consumption also showed little change over the 1983 levels of 2.86 million tons of product containing 570,000 tons of K_2O equivalent.

All potash in the GDR was mined by underground operations; to expand production, a tentative agreement was reached in December 1984 with the FRG to extract potash in the Werra River area in the border region between Hesse in the FRG and Thuringia in the GDR. To maximize product extraction further, VEB Kombinat Kali, the only producer, set up a new evaporation plant for the manufacture of highly concentrated magnesium chloride-potassic brine from potash containing magnesium chloride and bromine. The plant is at Sondershausen, one of the largest potash

producing areas in the GDR, managed by Kalibetrieb Sud-Harz. A new magnesium oxide plant at Tautenthal was also separating potassic brines thermally in a reactor into hydrochloric acid and magnesium oxide-sinter magnesite.

Potash exports from the GDR have changed very little in the last several years. Eastern Europe, including the non-CMEA member Yugoslavia, remained the largest importer, with Czechoslovakia being the largest customer. Western Europe was GDR's second most important region for potash exports.

The capacity of the Port of Wismar, the main port for potash loading on the Baltic Sea, underwent 4 years of modernization and reconstruction. The GDR was previously able to barge materials, but not from Wismar. The port is between 250 and 450 kilometers from potash plants in the northwest, and until now, the product was moved in 22-ton tipper wagons. Robot unloading equipment for up to 190 to 220 rail wagons per day was also installed.[13]

MINERAL FUELS

Lignite, often referred to as brown coal, continued to provide a large share of the total energy consumed in the GDR. In 1984, this was estimated at 72%, compared with 71% in 1983. There was considerable increase in primary energy consumption, perhaps 4% to 5%, the highest since 1976. A large part of the consumption increase was brought about by the increased availability of lignite, production of which reached 296 million tons. The minor GDR natural gas production also increased, to about 424 billion cubic feet, but, in view of limited gas reserves, the increase could not be considered to indicate a trend. The trend upward in consumption, however, evidently resulted from a very cold winter, the difficulty of substituting lignite for coal on a one-for-one basis, greater transport demands, even for lignite itself, and diminishing opportunities for conservation.

Coal.—Efforts to increase production of lignite, the major fuel mineral produced in the GDR, which provided over 70% of primary energy supply, continued during the year. Three large new mines in the Cottbus areas made substantial progress toward coming into production: at the North Kettwitz open pit, which is to supply the Lauchhammer processing plant, overburden removal began; at Dreiwebern, in the same area, production for the Boxberg power stations began at the rate of 3,000,000 to 4,000,000 tons per year; and the first shipment from the Grabendorf Mine nearby, ultimately to produce 4 million tons per year, was sent to the Luebbenau-Veitschau power station. Mines in this area were operated by the Senfenberg Combine, which produced in all, from 14 mines, about 185 million tons of lignite, out of a national goal of 295 million tons in 1984, and over 300 million tons in 1985. Expansion, in all regions, was under way at eight other lignite mining combines. Figures for lignite capacity and production included those for what GDR authorities sometimes call brown coal.

Increasing production came against a background of two problems: increasing cost and increasing salt content of remaining reserves. Large amounts of saliniferous lignite occur in the Halle District, but are otherwise of good quality and of high calorific value. The Vockerode powerplant was switched to the use of this coal on an experimental basis, although the sodium oxide content of 0.5% or more can be highly damaging to the boilers. Initial shipments of lignite were from the Geiseltal Mine.

In the period 1970 to 1980, the cost of lignite extraction rose 85%, largely because of growing unfavorable mining conditions. The conditions can only deteriorate if production goals of 300 million tons by 1985 and 315 million tons by the year 2000 are met. Operators feel that there is little room for further technological improvements.

Natural Gas and Petroleum.—Production of oil and gas in the GDR continued to be negligible, and efforts were devoted to ensuring supplies from external sources, particularly the Soviet Union. In September, two contracts were signed between the Government of the GDR and the U.S.S.R, one for 220 billion cubic feet of natural gas and one for 125 million barrels of petroleum in 1985. These represented no increase over supplies from the U.S.S.R. in previous years, but rising costs of these imports (from about $1.7 billion in 1980 to $3.8 billion in 1984) has made conservation imperative. The GDR is the Soviet Union's largest customer for oil and gas. The reported continuing rise in lignite production and consumption in powerplants has been another response, but the increasing level of atmospheric pollution this caused has aroused serious concern. The GDR was reported to have the most heavily polluted atmosphere in Europe.

The remainder of the GDR's petroleum

supply came from hard currency areas. An agreement was signed in December to purchase 20,000 barrels per day from Iran during 1985, with a possibility of increasing this by 50%. This was apparently the first major GDR purchase of Iranian oil.

Nuclear Energy.—Attention continued to be focused on expanding nuclear energy production, the chief alternative to lignite. A new "Law on the Use of Atomic Energy and Protection Against its Dangers" was enacted December 8, 1983, and took effect on February 1, 1984, replacing legislation dated March 28, 1962. The law covers use of nuclear energy in plants, the handling of radioactive substances, and ionizing radiation of all kinds; penalties are included for careless or criminal acts in connection therewith. Much stress is laid on peaceful uses of the atom and social responsibility of the various levels of government and private individuals. Liability for damage includes required compensation. Fines and imprisonment are provided for violations.

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[2]Bachmann, H. Indigenous Raw Materials and Economic Strategy. Urania (Leipzig), Aug. 1984, pp. 12-16.
[3]Hauk, P. German Democratic Republic. Min. Ann. Rev. (London), 1985, pp. 521-522.
[4]Frankfurter Allgemeine Zeiting (Frankfurt). Feb. 13, 1985, p. 14.
[5]The German Democratic Republic's mark (M) is not convertible, and the official exchange rate cannot be used as a measure of relative values. Foreign trade figures, however, are denoted in valuta marks (VM), which are convertible; the rate of valuta marks converted to U.S. dollars in 1984 was taken as VM2.80=US$1.00.
[6]Work cited in footnote 2.
[7]Vneshnyaya Torgovlya S.S.S.R. v. 1984. (The Foreign Trade of the U.S.S.R. in 1984). (Moscow). P. 127.
[8]Metal Bulletin Monthly (London). Jan. 1985, p. 31.
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